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United States Patent [19]

Katzenberger

[54] **METHOD AND SYSTEM FOR STORING INFORMATION IN A COMPUTER SYSTEM MEMORY USING HIERARCHICAL DATA NODE RELATIONSHIPS**

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[51] **Int. Cl.⁶** **G06F 17/30**

[52] **U.S. Cl.** **707/102; 707/2**

[58] **Field of Search** 707/100, 101, 707/103, 104, 3, 4, 5, 6, 2, 102; 395/672

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[57] **ABSTRACT**

A method, system, and data structure for storing information in a computer system memory using a directed acyclic graph structure having related data nodes. Any node can "own" other nodes in hierarchical relationships. Data is stored in a file structure with (1) a heap for storing chunks or nodes of data in memory locations, and (2) an index containing information about the relationships between nodes. Each node is referenced and accessed by information stored in the index. Each ownership relationship between nodes is referenced uniquely by the triple consisting of the identification of the parent node, the identification of the child node and a child identification value. The inclusion of a child identification value in the triple allows a node to be a child of another node a multiplicity of times. The index is a table of entries, one entry for each node. Each entry contains the identifier of the node and, if there are relationships with other nodes, a list of one or more references to child nodes. A data file constructed in accordance with the invention allows hierarchical data structures, multiple use of the same data, and cross-ownership of data, resulting in more efficient usage of memory.

16 Claims, 14 Drawing Sheets

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